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proval and cooperation to the plan by sending their names to the secretary, Mr. B. M. Headicar, librarian of the London School of Economics (University of London), Clare Market, London, W.C.

#### PUBLICATIONS FOR EUROPEAN NATIONS

OWING to the depreciated currency of Europe and the financial difficulties in which many European nations find themselves, the publication of some European serials has been temporarily discontinued, others have decreased in size, while the publication of still others is irregular. Furthermore, the purchase of American books at the present rate of exchange is practically impossible.

Since it is essential for the intellectual life of mankind, that students of all countries should be in close touch, and since it seems of importance to America that the results of our intellectual activities should be known, the undersigned urge all publishers, publishing institutions and publishing societies to exchange their publications on the most liberal terms with libraries, publishers, journals and publishing institutions and societies of all European countries, disregarding for the near future the question whether the amount of printed matter received in exchange corresponds with the amount sent.

(Signed)

Felix Adler,  
James R. Angell, Franz Boas, Charles W. Eliot, J. Cardinal Gibbons, Arthur T. Hadley, David Starr Jordan, Harry Pratt Judson, E. H. Lewinski-Corwin, A. Lawrence Lowell, John Bassett Moore, Henry Fairfield Osborn, George Foster Peabody, M. I. Pupin, Jacob Gould Schurman, Ellery Sedgwick, F. J. V. Skiff, Munroe Smith, Antonio Stella, Henry Suzzallo, Harlan F. Stone, William H. Taft, F. A. Vanderlip.

#### TABLES OF THE MOTION OF THE MOON

THE "Tables of the Motion of the Moon," by Ernest W. Brown, Sc.D., professor of mathematics in Yale University, has now been published through the Yale University Press. It is the result of thirty years of research and preparation.

The first tables of the moon, founded on the

law of gravitation, were published by Clairaut in 1752, but the tables published in 1857 by Hansen were the first which permitted the position of the moon to be computed from theory with an accuracy comparable with that of observation. The only other set of like importance is the tables founded on Delaunay's theory, appearing in 1911 under the final direction of Radau. These have been used for the ephemerides of the moon since their publication. The appearance of Professor Brown's tables is expected to constitute a new epoch in the history of astronomical tables, and to exercise a marked effect on navigation.

Professor Brown, a graduate of Christ's College, Cambridge, has held the chair of mathematics at Yale University since 1907, having previously been professor at Haverford College. He is the author of "Treatise on the Lunar Theory," 1896; "A New Theory of the Moon's Motion," 1897 to 1905; and of many papers on the lunar theory and on celestial and general mechanics. He received the gold medal of the Royal Astronomical Society in 1907, and the Royal Medal in 1914. The latest honor which has come to him is the Bruce medal of the Astronomical Society of the Pacific, which he recently went to San Francisco to accept.

Professor Brown is a fellow of the Royal Society and of the Royal Astronomical Society, a member of the London Mathematical Society, the Cambridge Philosophical Society, the American Philosophical Society, the American Mathematical Society, of which he was president from 1914 to 1916, the American Association for the Advancement of Science, being vice-president of Section A in 1910, and the American Academy of Arts and Sciences.

The work of Professor Brown has been printed in three parts, bound in paper covers in order that the various purchasers of the tables may bind them to suit their individual needs. The book has been printed on hand-made paper, by the Cambridge University Press in Cambridge, the size of the page being 10½ by 13½ inches. In concluding his preface to the "Tables of the Motion of the Moon" Professor Brown has made the following statement:

This volume brings to a close the work started thirty years ago with a study of Hill's papers made at the suggestion of my former teacher and friend, George Darwin. The undertaking of a complete recalculation of the moon's motions and later of tables which should make the theory available for practical and scientific use was no ambitious plan formed at the beginning but grew naturally out of the desire to continue the work as each stage in it was reached. Some part of it has always been in progress and there have been long periods during which it has been my sole occupation outside of the duties connected with an academic position and of the hours given to recreation. The word "finis" brings with it some feeling of regret. The time spent in actual calculation was often a relief from attempts to solve more difficult problems in other lines. To what extent it has been worth while as a contribution to the subject must be left to the future and to others for judgment. My hope is that it will give some aid in unravelling the tangled skeins of problems which our nearest celestial neighbor has never failed to present, and that the satisfaction to myself in seeing the work finally brought to a conclusion will be shared by those who have been interested in watching its progress.

#### THE DIRECTOR OF THE BUREAU OF MINES

THE nomination of Dr. Frederick G. Cottrell for director of the Bureau of Mines, Department of the Interior, was sent to the Senate on May 5 by President Wilson, to take the place of Dr. Van. H. Manning, resigned. Dr. Cottrell was the assistant director of the bureau under Dr. Manning.

Frederick G. Cottrell, chemist, metallurgist and inventor, was born in Oakland, Calif., January 10, 1877. He attended school in Oakland and matriculated at the University of California in 1892. As a university student he gave especial attention to science, particularly chemistry. After graduation in 1896, with the degree of bachelor of science, he was a Le Conte fellow at the University in 1896-1897 and taught chemistry at the Oakland High School in 1897-1900. Then he went to Europe, where in 1901 and 1902 he studied at the University of Berlin and the University of Leipzig, receiving from the latter the degree of doctor of philosophy in 1902. On his return to this country in 1902, he was ap-

pointed instructor in physical chemistry at the University of California, and in 1906 was appointed assistant professor, holding this position until 1911. While at the university Dr. Cottrell's chief contributions to science were researches relating to the electrical precipitation of fume and fine particles suspended in the gases of smelter, blast furnace or cement works flues, and he finally evolved what is known as the Cottrell process for this purpose. This invention was first utilized at the Selby smelter in California for removing fumes from the waste gases of a sulphuric acid plant at the smelter, thereby abating a nuisance that threatened to necessitate shutting down the works. Subsequently this electrical precipitation process was installed at other smelters to remove fume and solid particles contained in the escaping gases, and it was also successfully used at cement plants, notably near Riverside, Calif., to prevent the dust from calcining kilns from damaging nearby orange groves and vegetation. To-day the Cottrell process of fume and dust removal is in world-wide use, and is recovering materials heretofore wasted to the value of many thousands of dollars. One of the latest installations is at a large smelting plant in Japan; while the largest installation is at the Anaconda smelter, Anaconda, Mont. Dr. Cottrell in a desire to encourage scientific research turned over his extensive patent rights to a non-dividend-paying corporation, known as the Research Corporation, a body formed for that purpose. A fundamental requirement in the incorporation is that all net profits shall be devoted to the interests of scientific research.

In 1911 when Dr J. A. Holmes, the first director of the Bureau of Mines, was serving as a member of commissions appointed by the government to study alleged damages from smoke and fumes from the Selby and the Anaconda smelters, and the Bureau of Mines was investigating at length the smelter-smoke problem, Dr. Cottrell, because of his scientific attainments and his special knowledge of metallurgical problems, was appointed chief physical chemist in the bureau. In 1914 he